AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Previously Presented) An integrated circuit comprising:

a register to store a threshold temperature value;

a thermal sensor; and

clock adjustment logic to decrease a clock frequency in response to the thermal sensor indicating that the threshold temperature value has been exceeded, the clock adjustment logic further to increase the clock frequency in response to one of passage of a predetermined amount of time following the decrease in clock frequency and the thermal sensor indicating that the sensed temperature is less than the threshold temperature.

2. (Original) The integrated circuit of Claim 1 further comprising:

threshold adjustment logic to increase the threshold temperature value to a new threshold temperature value in response to the thermal sensor indicating that the threshold temperature value has been exceeded.

3. (Currently Amended) The integrated circuit of Claim 2 wherein the threshold adjustment logic ~~is further~~ comprises logic to increase the new threshold temperature in response to the thermal sensor indicating that the new threshold temperature has been exceeded.

4. (Currently Amended) The integrated circuit of Claim 3 wherein the threshold adjustment logic ~~is further~~ comprises logic to lower the new threshold temperature to detect decreases in temperature.

5. (Canceled)

6. (Canceled)

7. (Currently Amended) The integrated circuit of Claim 1 further ~~comprising~~ comprising:

a fail-safe sensor and halt logic to halt operation of the integrated circuit in response to the fail-safe sensor indicating that a fail-safe threshold temperature has been exceeded.

8. (Currently Amended) The integrated circuit of Claim 7 wherein the halt logic [[is]] comprises logic to inhibit operation of the integrated circuit by stopping a clock of the integrated circuit.

9. (Original) The integrated circuit of Claim 7 wherein the fail-safe threshold temperature is a predetermined fixed critical temperature.

10. (Original) The integrated circuit of Claim 1 wherein the thermal sensor comprises a plurality of thermal sensors placed across the integrated circuit and an averaging mechanism to calculate an average temperature from the plurality of thermal sensors.

11. (Currently Amended) The integrated circuit of Claim 1 further ~~comprising~~ comprising:

an interrupt handler to display information regarding the sensed temperature to a user of the integrated circuit.

12. (Currently Amended) The integrated circuit of Claim 1 further ~~comprising~~ comprising:

interrupt logic to generate a first interrupt if the calculated average temperature exceeds a first threshold and a second interrupt if the calculated average temperature exceeds a second threshold.

13. (Original) The integrated circuit of Claim 1 wherein the clock adjustment logic executes instructions to vary the frequency of a clock signal of the integrated circuit in response to the thermal sensor.

14. (Original) The integrated circuit of Claim 1 wherein the clock adjustment logic executes instructions to provide closed loop control of the integrated circuit clock frequency, thereby automatically reducing the temperature when overheating occurs.

15. (Currently Amended) The integrated circuit of Claim 1 further ~~comprising~~ <u>comprising:</u>

interrupt logic to activate an active cooling device in response to the thermal sensor.

16. (Previously Presented) A method comprising:

storing a threshold temperature value in a register of an integrated circuit;

sensing the temperature within the integrated circuit;

decreasing a clock frequency of the integrated circuit in response to the sensed temperature exceeding the threshold temperature value; and

increasing the clock frequency in response to one of passage of a predetermined amount of time following the decrease in clock frequency and sensing that the temperature within the integrated circuit is less than the threshold temperature.

17. (Original) The method of Claim 16 further comprising:

increasing the threshold temperature value to a new threshold temperature value in response to the sensed temperature exceeding the threshold temperature value.

18. (Original) The method of Claim 17 further comprising increasing the new threshold temperature in response to the sensed temperature exceeding the threshold temperature value.

19. (Original) The method of Claim 16 further comprising lowering the new threshold temperature to detect decreases in temperature.

20. (Canceled)

21. (Canceled)

22. (Original) The method of Claim 16 further comprising displaying information regarding the sensed temperature to a user of the integrated circuit.

23. (Original) The method of Claim 16 further comprising executing instructions to vary the frequency of a clock signal of the integrated circuit in response to the sensed temperature.

24. (Original) The method of Claim 16 further comprising executing instructions to provide closed loop control of the integrated circuit clock frequency, thereby automatically reducing the temperature when overheating occurs.

25. (Canceled)

26. (Previously Presented) A microprocessor comprising:

a register to store a register value corresponding to a threshold temperature;

a programmable thermal sensor to receive the register value, wherein the programmable thermal sensor is to generate a first interrupt signal in response to an internal microprocessor temperature exceeding the threshold temperature corresponding to the register value;

clock circuitry to provide a clock signal for the microprocessor;

a processor unit coupled to the clock circuitry, wherein the processor unit executes instructions to reduce a frequency of the clock signal in response to the first interrupt signal; and

a fail-safe thermal sensor generating a fail-safe interrupt signal if the microprocessor temperature exceeds a fail-safe threshold temperature, wherein the processor unit is halted in response to the fail-safe interrupt signal.

27. (Previously Presented) The microprocessor of claim 26 wherein the clock circuitry further comprises a phase locked loop.

28. (Previously Presented) The microprocessor of claim 26 wherein the thermal sensor comprises:

a current source;

a voltage reference coupled to the current source to provide a bandgap reference voltage, wherein the bandgap reference voltage is substantially constant over a range of temperatures;

programmable circuitry providing an output voltage varying with the microprocessor temperature in accordance with the register value; and

a comparator, wherein the comparator generates the first interrupt signal if a difference between the output voltage and the bandgap reference voltage indicates that the threshold temperature has been exceeded.

29. (Original) The microprocessor of claim 28 wherein the programmable circuitry further comprises:

a transistor coupled to the current source to provide the output voltage, a gain ratio of the output voltage to a junction voltage of the transistor controlled by a transistor bias, wherein the junction voltage varies in accordance with a junction temperature of the transistor, the junction temperature corresponding to the microprocessor temperature, a bias circuit providing the transistor bias to control the gain ratio, wherein the output voltage varies with the microprocessor temperature in accordance with the register value.

30. (Original) The microprocessor of claim 29 wherein the bias circuit further comprises binary weighted resistors.

31. (Canceled)

32. (Previously Presented) A microprocessor comprising:

a register to store a register value corresponding to a threshold temperature;

a programmable thermal sensor to receive the register value, wherein the programmable thermal sensor is to generate a first interrupt signal in response to an internal microprocessor temperature exceeding the threshold temperature corresponding to the register value;

clock circuitry to provide a clock signal for the microprocessor; and

a processor unit coupled to the clock circuitry, wherein the processor unit executes instructions to reduce a frequency of the clock signal in response to the first interrupt signal, and

wherein the processor unit executes instructions to provide closed loop control of the microprocessor clock frequency, thereby automatically reducing the temperature when overheating occurs.

33. (Previously Presented) The microprocessor of claim 32 wherein the clock circuitry further comprises:

a first clock;

a frequency divider coupled to the first clock to provide the clock signal, the frequency divider reducing a frequency of the clock signal in response to the interrupt signal; and

a second clock circuit coupled to provide the clock signal to the microprocessor.

34. (Previously Presented) A microprocessor comprising:

a register to store a register value corresponding to a threshold temperature;

a programmable thermal sensor to receive the register value, wherein the programmable thermal sensor is to generate a first interrupt signal in response to an internal microprocessor temperature exceeding the threshold temperature corresponding to the register value;

clock circuitry to provide a clock signal for the microprocessor; and

a processor unit coupled to the clock circuitry, wherein the processor unit executes instructions to reduce a frequency of the clock signal in response to the first interrupt signal, and

wherein the processor unit programs the register with another register value corresponding to another threshold temperature in response to the first interrupt signal.

35. (Previously Presented) A method of controlling a temperature of a microprocessor, comprising:

storing threshold temperature values in a register of the microprocessor;

generating a temperature signal within the microprocessor indicative of the temperature of the microprocessor;

comparing the temperature signal with a first threshold temperature level within the microprocessor;

generating an interrupt signal if the temperature signal indicates that the first threshold temperature level has been exceeded;

decreasing a microprocessor clock frequency in response to the interrupt signal; and

increasing the microprocessor clock frequency in response to one of passage of a predetermined amount of time following the decrease in microprocessor clock frequency, and the temperature signal indicating that the temperature of the microprocessor is less than the first threshold temperature level.

36. (Original) The method of claim 35 further comprising:

comparing the temperature signal with a second threshold temperature level, wherein the second threshold temperature level represents a fail-safe temperature; and halting the microprocessor, if the temperature signal indicates that the second threshold temperature level has been exceeded.

37. (Original) The method of claim 35 further comprising:

generating a fail-safe interrupt signal if the microprocessor temperature exceeds a fail-safe threshold temperature; and

halting the microprocessor in response to the fail-safe interrupt signal.

38. (Original) The method of claim 35 wherein generating a temperature signal comprises:

providing a bandgap reference voltage, that is substantially constant over a range of temperatures;

providing an output voltage varying with the microprocessor temperature in accordance with a stored register value; and

wherein generating an interrupt signal comprises generating the first interrupt signal if a difference between the output voltage and the bandgap reference voltage indicates that the threshold temperature has been exceeded.

39. (Original) The method of claim 35 further comprising providing closed loop control of the microprocessor clock frequency, thereby automatically reducing the temperature when overheating occurs.

40. (Original) The method of claim 35 further comprising programming the microprocessor with a second threshold temperature.